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Vol. VI., No. 27.] BULLETIN OF THE TORREY BOTANICAL CLUB. [New York, Mch., 1877.

§ 148. Fresh Water Algae. II.

In putting forth this addition of one hundred species to the Fresh Water Algae of our country it is proper to preface it by a few brief remarks.

In general I have followed the nomenclature of Dr. L. Rabenhorst and others of the German schools, but, in a few instances, have deviated to the more modern arrangement suggested by the late Dr. M. G. Thuret, of France, as given to the public by his co-worker and successor, Dr. E. Bornet, of Paris. Unfortunately the new classification covers only one division, the "Nostochinées."

Thuret set out with the idea that many genera have been created upon insufficiently defined characters, and that many species have been described from the same plant found by different authors in various localities in different stages of development. There is no doubt that many spurious forms are found on record as distinct plants. As an illustration I quote only one example. I found "Gloeotrichia" in abundance in a pool near Buffalo, N. Y. The thalli varied in size from that of a mustard seed to that of a hen's egg. Trying to identify it, I found forms to correspond to no less than eight described species, yet evidently all one plant. Thuret suggests Gloeotrichia *natans*, to take in nine forms. My study of this subject has been brief, only three years, yet the wisdom of Thuret's suggestion is evident.

Dr. H. C. Wood, Jr., of Philadelphia, made the Fresh Water Algae a study for a couple of years, but abandoned it quite too soon. The result of his labors is a valuable work published by the Smithsonian Institute, in many respects an excellent guide, and especially convenient as a compilation of all plants heretofore found in this country. It is a great pity that he did not pursue his studies a longer time. Errors that crept into his work could have been most easily and satisfactorily corrected by himself.

In the subjoined list only such species are named as are believed to be entirely new discoveries for the United States. All plants heretofore positively quoted by Bailey, Olney, Wood and others, are omitted. Those not having the locality noted have been found within a circuit of about twenty miles around Bethlehem, Pa. Where the special habitat is omitted, it is supposed to be the same as that given by the author of the species. FRANCIS WOLLE.

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1. **Chroococcus,** Naeg. Ch. rufescens, Naeg., Niagara, N. Y.—Ch. turgidus, Naeg.

2. **Gloeocapsa,** Ktz.—Gl. Itzigsohnii, Bornet. Shaded rocks.—Gl. janthina, Naeg. Cliffs, Niagara.—Gl. aeruginosa, Ktz. Niagara.—Gl. ochracea, Ktz.—Gl. gelatinosa, Ktz.—Gl. mellea, Ktz. Colorado. Gl. haematodes, Ktz. Swampy ground.

3. **Aphanocapsa,** Naeg.—A. rivularis, Rabenh. In ponds, attached to wood or stone.

4. **Anacystis.**—A. marginata, Menegh. Pools.

5. **Polycystis,** Ktz. P. piscinalis, Brüg. Pools.

6. **Gloeothece,** Naeg.—*Gl. magna, n. sp.* Thallus large, thin, irregularly oblong, pale yellowish green. Cellules nearly twice as long as wide, many in a family; teguments usually colorless at the margins, cytioplasm homogeneous. Cellul. .00012″–.00016″ wide. Teg. .002″–.006″ long. about one-third as wide. Forms a coating on small water plants, or floats in ponds, many families joined together.

7. **Vibrio,** Müller.—V. Rugulo, Mül.—V. lineola, Mül. On Nuphar advena, in ponds.

8. **Oscillaria,** Bosc.—O. tenerrima, Ktz.—O. major, Vauch.—O. Bonnemaisonii, Crouan.—O. brevis, Ktz.—O. gracillima, Ktz.

9. **Phormidium,** Ktz.—Ph. congestum, Rabenh.—Ph. vulgare, Ktz. Both on damp earth.

10. **Microcoleus,** Desmaz.—M. terrestris, Desmaz. (*Chthonoblastus Vaucheria,* Ktz.)

11. **Hydrocoleum,** Ktz.—H. versicolor, Rabenh. Wet rocks.

12. **Symploca,** Ktz.—S. lucifuga, Breb. Shaded clay banks.

13. **Gloeotrichia,** J. Ag.—Gl. natans, Thuret. Fronds, attached to water plants in pools, Buffalo, N. Y.—Gl. pisum, Thuret. On leaves of a small form of Potamogeton in ponds.

Dr. Wood evidently found forms of this genus; the one in a decayed condition, and the other in an immature state. The one he named, *Gl. incrustata,* and the other, *Dasyactis mollis.*

14. **Zonotrichia,** J. Ag.,(*Rivularia,* Thuret).—*Z. paradoxa,* n. sp.—Thallus hemispherical, gelatinous, bright aeruginous green; trichoma green, or tinged with brown, granular, apex colorless, continuous or indistinctly divided; articles subequal -to three times as long as wide, very variable; younger filaments flagelliform, older ones often contracted in the middle, or narrow below and gradually widened more than half the length, then tapering to a fine point. Filaments of the latter form are usually much longer, double the length of the former. Diameter of wider parts, .00025″–.0003″. Heterocyst, .0004″–.0005″.—Z. chrysocoma, Rabenh. Moist rocks, Niagara. Wood's *Z. parcezonata* is probably the young growth of the latter.

15. **Mastigonema,** Schwabe., (*Calothrix,* Ag.)—M. caespitosum, Ktz. Common on submerged stones.—M. Orsinianum, Ktz. On rocks in rapids of Niagara river.—M. plana, Rabenh. Wet rocks, Portage, N. Y.

M. violacea, n. sp. Caespitose, parasitic, aeruginous, trichoma simple, occasionally interrupted, usually ending in an extended, colorless point. Divisions often indistinct, short, one-forth to one-half as long as wide below, and longer towards the ends, finally four to six times as long as wide. Sheath ample, often truncate, almost colorless. Heterocysts more or less compressed. Filaments usually in clusters, ten to twelve arising from the same thallus, a sort of warty excrescence. Color of the young plants aeruginous; as they mature they change to a purplish iron or amethyst color. Old plants are olivaceous-brown. Trichoma .0003″–.00038″. Sheath .00067″–.00075″. Parasitic on Plectonema in shallow river waters. Near *Lyngbya confervicola,* Dillw., but beside not being marine, it varies in size, and has the divisions twice as large.

M. fusca, n. sp. Parasitic on Cladophora, etc. Trichoma simple, long, olivaceous, brownish-yellow, or dull aeruginous. Mature plant not articulate, or very indistinctly so, except the rather long, thin, colorless ends, in which the divisions are two to four times as long as wide. Filament linear, granular. Sheath rarely seen. Heterocysts spherical, rather smaller than the adjoining cells. Plants vary greatly in length, from 10 to 100 and more diameters. The young plants are distinctly articulate, usually one large cell next the heterocysts; other divisions about as long as wide; filaments at first in a horizontal position, one on the other; as they mature they become erect and tortuous, caespitosely attached. Filaments .0003″ to .0004″ in diameter.

M. lutea, n. sp. Strata thin ochreous, filament aggregated, suberect or flexuonsly curved, simple. Trichoma bright brownish-orange, distinctly articulate, articles half as long as wide, and usually separated by a distinct space. Sheath ample, often twice as wide as the trichoma, and tinged with the same color, or colorless, firm, slightly attenuated, generally open at the apex, and extending beyond the trichoma. Heterocysts oblong-globular. Sheath .00084″ below, tapering to .0005″. Partly exposed stones in spring water.

16. **Diplocolon.**—D. Heppii, Naeg., Niagara.

17. **Scytonema,** Ag.—Sc. tolypotrichoides, Ktz. In gelatinous masses on dripping rocks.—Sc. Hegetschweileri, Itz. Forms a dark brown coating on wet rocks, Niagara; differs very slightly from the European form. Probably the same plant Dr. Wood described under the name, *Sc. cataracta.* See Rabenhorst's Algen Europa's, No. 2492.—Sc. Chrysochlorum, Ktz., Niagara, shaded rocks.—Sc. natans, Breb. In pools.

18. **Symphyosiphon,** Ktz.—S. incrustans, Ktz.—S. Contarenii, Ktz. Both common on rocks exposed to the spray of Niagara Falls.

S. Wollei, Bornet, *n. sp.* Forms a more or less expanded stratum, one line high, on calcareous rocks. Olive black, ascending, curved, sparsely branched, single or geminate patent. Trichoma continuous, or indistinctly articulate; articles equal to or less than diameter, rarely submoniliform, towards the ends two or three divisions to diameter, often distinct, dull aeruginous or olive-yellow, granular, not enlarged at the ends. Sheath firm, smooth and usually very close. Ends rounded but often open and colorless. Heterocysts subglobose or nearly square. Vag. .0006″–.00081″.

19. **Tolypothrix,** Ktz.—T. muscicola, Ktz. Pond mosses.—T. truncicola, Thuret, moist wood.

20. **Plectonema,** Thuret.—Pl. mirabile, Thuret. On wood and moss in lime stone springs.—Pl. Wollei, Farlow. For description, see Bulletin of Bussey Institution, Vol. II., part 1., p. 75. Attached to stones and sticks in slow waters.

21. **Fischera,** Schwabe.—F. thermalis, Schwabe. Differs from the European form in having the trichoma more than one-third thicker. In small pools in swampy ground.

22. **Pleurococcas,** Menegh.—Pl. minuatus, Ktz.—Pl. vulgaris, Menegh.

23. **Gloeocystis,** Naeg.—Gl. rupestris, Lyngh. Calcareous rocks in a cave.

24. **Urococcus,** Hassel.—U. Hookerianus, Berk. Dripping rocks.

25. **Tetraspora,** Link.—T. gelatinosa, Desv. Attached to logs and stones in ponds.

26. **Hormospora,** Breb.—*H. geminella*, n. sp. Filaments simple, tubular, aggregated or single; sheath firm, colorless; cells bright green, granular, oval, or cylindrical with ends rounded, more or less in pairs, rather closely connected, but more widely separated as the plant matures. Diam. of cells .00064″; filaments .00083″. In pools of exposed water. Frequent here, also at Buffalo, N. Y., and in Colorado.—See Rabenhorst's Algen Europa's, Dec. 240, No. 2494.

H. pygmaea, n. sp. Filaments single, gelatinous, even, or, by longitudinal division of cells, often undulate. Articles subequal with diameter, colorless, each contains two green cells, half as long as wide, transversely arranged. The general appearance very near Rabenh's figure of H. transversalis, Breb., but very diminutive compared with it. Diam. of fil. .0005″. In pools.

27. **Hydrurus,** Ag.—H. olivaceus, Naeg. Logs and stones in rapid, shallow waters.

28. **Protococcus,** Ag.—Pr. viridis, Ag.—Pr. fuligineus, Lenorm.

29. **Chlorococcum,** Fries.—Ch. humilicola, Naeg. Sides of shaded wooden vessels of water.—Ch. gigas, Grun.—Ch. infusorum, Menegh. Both in pools.

30. **Polyedron,** Naeg.–P. trigonum, Naeg.–P. tetraedricum, Naeg.

P. *aculeatum*, n. sp. Triangular sides concave ; one surface conically elevated, and ending, like the three angles, with a rather long sharp aculeus.

31. **Ophiocytium,** Naeg.—O. majus, Naeg.—O.(*Sciadium*) arbuscula, A. Braun. Marsh pools, etc.

32. **Coelastrum,** Naeg.—C. Naegelii, Rabenh.

33. **Staurogenia,** Ktz.—*St. crucifera*, n. sp. Cells rhomboid. Sides slightly concave, angles rounded; surface with two lines crossing each other at right angles at the centre. Usually four cells in a family. Diam. of fam. .00084″–.001″. On boarded sides of basins.

34. **Chlamydococcus,** A. Braun.—Chl. pluvialis, A. Braun.

35. **Chlamydomonas,** Ehrb.—Chl. obtusa, A. Braun.

36. **Pleurocarpus,** A. Braun.—Pl. mirabilis, A. Braun. Pools and shallow waters.

37. **Hydrogastrum,** Desv.—H. granulatum, Desv. Exposed soil, Buffalo, N. Y. Dr. Wood, also, found imperfect specimens of this plant.—H. Wallrothii, Ktz. Damp earth, Buffalo, N. Y.

38. **Vaucheria,** DC.—V. tuberosa, A. Braun, rather a doubtful species; shaded clay soil.—V. reptans, Hass. Shaded garden soil.—V. velutina, Ag. On earth saturated with warm water.

39. **Microspora,** Thuret.—M. laevis, Rabenh. From dripping rocks.

40. **Conferva,** Link. C. bombycina, Ag. Fresh spring water.—C. fontinalis, Berk., attached to wood in sides of reservoir of running water.

C. *Farlowii*, *n. sp.* Filament long, 2–8 or more inches, yellowish green in early spring, in maturer state usually of brownish or ochreous color, attached to stones or earth in small streamlets of fresh water. Divisions 2–3½ diameters, granular, and often tumid. When dried, dull greenish or ochreous. Diam. .00025″–.00038″.

C. *glacialioides*, n. sp. Near Ktz's C. glacialis. Light green. Length of divisions, 2–5 diameters ; not contracted at the joints. Divisions not swollen. Dries light pea-green. Diameter .00024″–.00032″. In gelatinous masses on dripping rocks.

41. **Psichohormium,** Ktz.—P. major, Ktz. Stagnant pools and quiet waters.

42. **Cladophora,** Ktz.—C. fracta, Dillw., frequent in pools.—C. viadrina, Ktz. Not uncommon on moist earth.—C. canalicularis, Roth. Niagara, Three Sister Islands.

43. **Chloropteres,** Mont.—Ch. Leprieurii, Mont. Found sparsely intermingled with a Conferva collected by Mr. Brandegee, Col. Observation of more ample specimens may change the specific name.

44. **Rhizoclonium,** Ktz.—Rh. hieroglyphicum, Ktz., *Var. Americanum*, new var. The size is larger, and the divisions are shorter than those of the European forms. Shaded garden ground and greenhouses. Represented in Rabenhorst's Algen Europa's, Dec., 240, No. 2496.

45. **Oedogonium,** Link.—O. subsetaceum, Ktz.—O. compressum, Hassel. Differs from the typical form in basal cells ; these are disciform, and not trilobate. On Spatter-Dock in pools.—O. capillaceum, Ktz.—O. fonticola, A. Braun. Ponds of spring water.

46. **Ulothrix,** Ktz. — U. varia, Ktz. Exposed clay soil.—U. tenuis, Ktz. On stones in rapid waters.—U. subtilis, Ktz. Not unfrequent in troughs of running water. — U. nitens, Menegh, forms a dark green coating on moist shaded stones and brick pavements.—U. flaccida, Ktz., frequent in green-houses, etc.

47. **Chroolepus,** Ag.—C. lageniferum, Hild.—C. umbrinum, Ktz. This is the same plant, figured by Wood as *Pleurococcus seriatus*. Bark of trees.

48. **Bulbotrichia,** Ktz.—B. *Onokoensis*, n. sp., found in small bright pea-green cushion forms, ⅛ in. to 1 inch in diameter, on partly shaded rocks in Onoko Glen. Represented in Rabenhorst's Algen Europa's. Decade 243, No. 2428.

49. **Schizogonium.**—Sch. Boryanum, Ktz. Rocks, Colorado. Collected by Mr. Brandegee.

Sch. Ravenelii, n. sp. Forms a thin olive green coating on bark of trees. Filaments flexuously interwoven, sometimes free, but more usually laterally united, commonly two, but frequently 3 or 4. Articles equal to half the diameter. Cytioderm thin, colorless. Diam. of fils., .00064″–.0007″. Collected by Prof. Ravenel, Aiken, S. C., from the bark of Melia Azederach, or China-Tree.

50. **Chaetophora,** Shrank.—Ch. radians, Ktz. Hab. on plants in pools.

51. **Stigeoclonium,** Ktz.—S. tenue, Ag.—S. thermale, A. Braun. Dr. Wood ventures no species. The former is probably the plant he observed.

52. **Aphanochaeta,** Brown. I find three varieties. Besides the name adopted by Dr. Wood, I add "A. confervicola," Naeg. Found parasitic upon other Algae.